Predictors of Postoperative Infections Following Elective Anterior Lumbar Interbody Fusion: A Large Database Study

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INTRODUCTION: Surgical site infection (SSI) is a serious complication following lumbar fusion surgery, associated with increased reoperation rates, prolonged hospitalization, higher healthcare costs, and patient morbidity. Anterior lumbar interbody fusion (ALIF) is a widely accepted surgical technique for treating various degenerative lumbar pathologies. While prior studies have identified risk factors for SSI in general lumbar fusion populations, large-scale data specific to elective ALIF are lacking. This study aims to identify patient-related risk factors for developing a 30-day postoperative SSI following elective ALIF.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for patients who underwent elective ALIF between 2010 and 2019 using CPT codes 22558 and 22585. Patients undergoing nonelective surgery or those with spinal deformity were excluded. SSI cases were defined as patients with deep, superficial, or organ/space infections within 30 days postoperatively as recorded in NSQIP. Univariate analysis using chi-square and one-way ANOVA tests identified candidate risk factors, which were further assessed through multivariate logistic regression to determine independent predictors of infection and corresponding odds ratios (ORs).

RESULTS: Out of 18,510 initial patients, 17,333 met all inclusion criteria and had complete data. Among these, 317 patients (1.8%) developed an SSI within 30 days postoperatively. Multivariate regression analysis identified obesity (BMI >30 kg/m^2) as an independent risk factor (OR = 1.8, 95% CI: 1.3–2.7, $p<0.001$), along with diabetes (OR = 1.5, CI: 1.2–2.0, $p=0.002$) and active smoking (OR = 1.4, CI: 1.1–1.9, $p=0.006$). Additional significant predictors included preoperative blood transfusion (OR = 5.1, CI: 2.8–25.6, $p<0.001$) and dialysis-dependent renal disease (OR = 8.5, CI: 2.0–13.3, $p<0.001$).

DISCUSSION AND CONCLUSION: Although elective ALIF is generally a safe and effective procedure, certain patient comorbidities significantly increase the risk of postoperative SSI. Obesity, diabetes, and smoking are modifiable risk factors that should be addressed during preoperative planning. High-risk features such as dialysis dependence and need for preoperative transfusion further elevate the risk. These findings highlight the importance of preoperative optimization and risk stratification in reducing SSIs after elective ALIF. Future prospective studies are needed to evaluate targeted interventions aimed at reducing infection rates in these high-risk populations.